

REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 3, 5, 11, 18, and 20-41 are pending in this application. Claims 3, 5, 11, and 39 are amended, Claims 40 and 41 are added, and Claims 15-17 are canceled by the present amendment. Further, Claims 20-38 stand withdrawn in response to a previous restriction requirement.

Applicants submit that amendments to the claims and new claims find support in the application as originally filed at least in the specification at page 45, lines 7-11, page 58, lines 20-26, and page 62, lines 20-25. Thus, no new matter is added.

In the outstanding Office Action, Claims 3, 5, 11, and 39 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent 5,710,620 to Taniguchi; Claims 15-18 were rejected under 35 U.S.C. § 103(a) as unpatentable over Taniguchi in view of Applicants' admitted art (AA).

Applicants respectfully traverse the rejection of Claims 3, 5, 11, and 39 under 35 U.S.C. § 102(b) as anticipated by Taniguchi, with respect to amended independent Claims 3, 5, 11, and 39.

Amended Claim 3 is directed to a crystallization apparatus that includes, in part, a phase modulation element, an illumination system, an image formation optical system, and a stage used to support a substrate having a non-single crystal semiconductor film. The phase modulation element includes at least two phase modulation units and is configured to transmit a light having a phase distribution based on a phase pattern of the at least two phase modulation units to vary a light intensity distribution to be increased substantially straight toward a periphery from a central area at the non-single crystal semiconductor film in the

substrate supported by the stage. Amended independent Claims 5, 11, and 39 include similar features.

Applicants' Figure 12A shows a non-limiting example of a light intensity distribution produced according to an embodiment of the amended independent claims. In this example, as described in the specification at page 45, lines 7-11, the light intensity characteristic has a linear falling gradient in the directions indicated by arrows 31x and 32x of Figure 12A. Further, the non-limiting embodiment of Applicants' Figure 11A shows the phase distribution that is based on a phase pattern of at least two phase modulation units and which varies the light intensity distribution as shown in Applicants' Figure 12A. Thus, as shown in the example of Figure 11B, the light intensity has a *linear* falling gradient. As described in the specification at page 36, line 10 to page 37, line 22, a crystal nucleus is generated at a position on a processed substrate 4 (e.g., a non-single crystal semiconductor film) corresponding to a bottom portion where the light intensity is minimum (e.g., a central area). Thus, a growth of a crystal advances along a temperature gradient from the crystal nucleus toward a periphery. Further, since the light intensity distribution increases linearly, the growth of the crystal does not stop or result in an incompletely grown crystal.¹

Applicants respectfully submit that Taniguchi fails to teach or suggest each of the features of the amended independent claims. For example, Applicants respectfully submit that Taniguchi fails to teach or suggest a transmitted light that has a phase distribution to vary a light intensity distribution to be increased substantially straight toward the periphery from a central area at a non-single crystal semiconductor film. Taniguchi describes a system for irradiating an illumination light onto a mask having a plurality of patterns through which pattern forming conditions differ from one another.² Taniguchi describes a projection

¹ Specification at page 4, lines 23-27, and page 37, line 23 to page 38, line 2.

² Taniguchi at Abstract.

exposure method and apparatus having a plurality of patterns and a projection optical system for projecting images of the patterns onto a photosensitive substrate.³ However, Taniguchi fails to teach or suggest a light intensity characteristic having a linear gradient, and Taniguchi fails to teach or suggest a light intensity distribution that is increased substantially straight toward a periphery from a central area of a semiconductor film. Accordingly, Applicants respectfully submit that Taniguchi fails to teach or suggest a phase modulation element that includes at least two phase modulation units and is configured to “transmit a light having a phase distribution based on a phase pattern of the at least two phase modulation units to vary a light intensity distribution to be increased substantially straight toward the periphery from a central area at the non-single crystal semiconductor film,” as recited in independent Claims 3, 5, 11, and 39.

Therefore, Applicants respectfully submit that independent Claims 3, 5, 11, and 39 patentably define over Taniguchi.

In addition, Applicants respectfully traverse the rejection of Claims 15-18 under 35 U.S.C. § 103(a) as unpatentable over Taniguchi and AA.

Claims 15-18 depend from independent Claim 11, which as discussed above is believed to patentably define over Taniguchi. Further, Applicants respectfully submit that AA fails to supply the claimed features lacking in the disclosure of Taniguchi. Accordingly, it is respectfully requested the rejection of Claims 15-18 under 35 U.S.C. § 103(a) also be withdrawn.

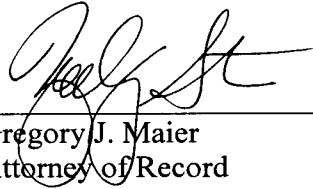
Accordingly, Applicants respectfully submit that independent Claims 3, 5, 11, and 39, and claims depending therefrom, are allowable.

³ Taniguchi at Fig. 1.

Consequently, in light of the above discussion and in view of the present amendment this application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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